

Service and Parts Manual



Quantum
Data
Projector

MODEL
28A680

Original Issue
April 1995

Audio Visual Products

DUKANE

General Specifications

Lens	Combined three element Standard (#463-263)/fourth element (#110-2610) Wide Angle Lens (327mm, 13in.; 280mm, 11in.)
Typical Illumination	7,800 Lumens (ANSI/ISO 9767:1990 Standard)
Color Temperature	5,600 K
Projection Stage Size	11.2 X 11.2 inches (285 X 285mm)
Focusing System	Rack & Pinion
Cooling System	Fans
Projection Lamp	575 Watt Metal Halide (#456-189)
Average Lamp Life	750 Hours
Storage Temperature	-4° to 140° F (-20° to 60° C)
Operating Temperature	40° to 95° F (4° to 35° C)
Power Requirements	100V (9.0A) - 250V (4.5A) AC, 50-60 Hz - 640W
Power Consumption	640W
Power Cord	3-Wire Ground, 10 ft. (#200-1009) IEC 320 - Class I Cordset
Built-In Safety	Safety Interlock System Automatic Thermal Cutoff
Dimensions - Folded	15.5" X 17.5" X 9.5" (WxDxH) 394mm X 445mm X 241mm (WxDxH)
Dimensions - Set Up	15.5" X 17.5" X 32" (WxDxH) 394 mm X 445 mm X 813 mm (WxDxH)
Weight	27.4 lbs (12.43 kg)
Accessories	185-381 Hard Carry Case 456-189 575W Metal Halide Lamp
Accessories Supplied	128-1 Dust Cover 200-1009 Power Cord

CAUTIONS, WARNINGS & IMPORTANT COMMENTS

Read and understand all instructions before using.

Close supervision is necessary when any projector is used by or near children. Avoid leaving the Projector unattended while in use.

If the Projector has been dropped or damaged or its cord has been damaged, wait to operate it until examined by a qualified service person.

Position the power cord and any cables so they will not be tripped over, pulled or in contact with hot surfaces.

If an extension power cord is necessary, use one with a current rating at least equal to the Projector's power cord rating. Cords rated with less amperage may overheat.

Unplug the power cord and all cables before cleaning and servicing and when not using. Avoid yanking the cord to disconnect from an outlet. Grasp the cord's plug to disconnect.

Allow the Projector to cool completely before putting it away.

To protect against the risk of electric shock, avoid immersing the Projector in water or other liquids.

To avoid the risk of electric shock, avoid disassembling the Projector, including for lamp replacement. Instead, have a qualified service repair person handle any disassembly. Otherwise, incorrect reassembly could cause electric shock upon subsequent use.

Fuse only those accessories and attachments recommended by the manufacturer. Others may cause a risk of fire, electric shock or injury.

Connect the Projector to a grounded electrical outlet.

Make sure the cooling fans are running properly whenever operating the Projector.

WARNING: brightness light sources, do not stare into the beam of light or view directly. Be especially careful that children do not stare directly into the beam of light.

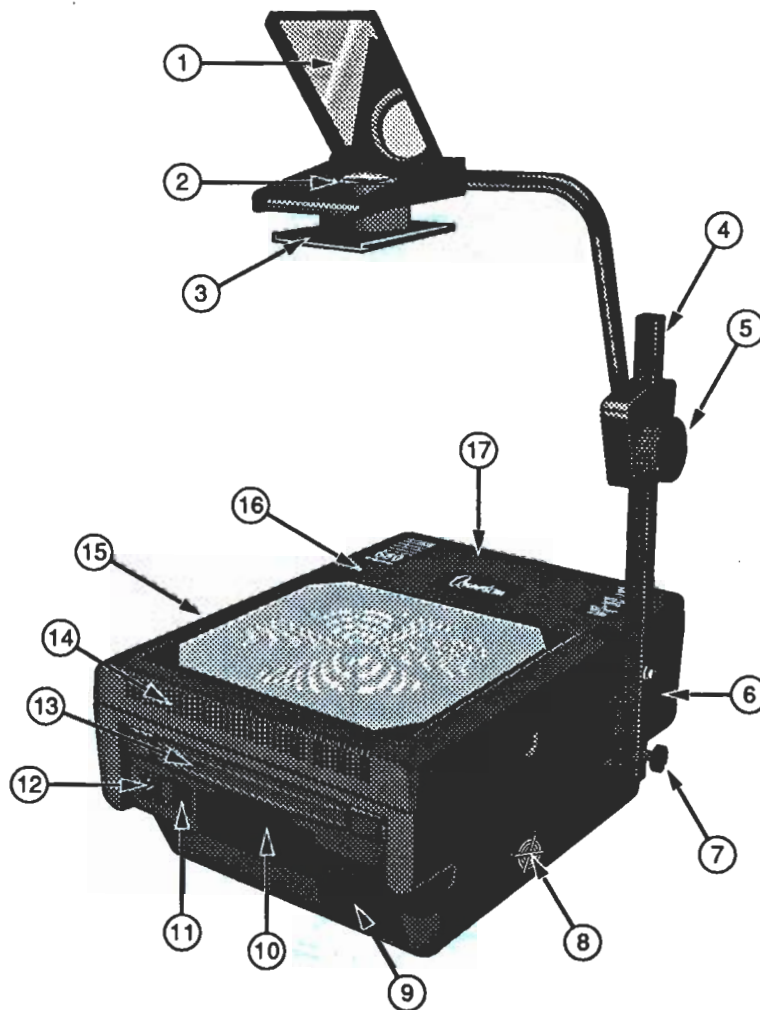
Read the Above Instructions Carefully!

PRIOR TO SET-UP

To ensure a flawless presentation, Dukane recommends that you familiarize yourself with the Model 680 Projector, check the presentation setting and practice your presentation with the Projector before using it in front of an audience.

An Illustrated Tour of the Model 680 Projector

To reap the full benefits of your service manual, familiarize yourself with the terms for the various parts of the Projector listed here.



- 1) Mirror
- 2) Three-Element Lens
- 3) Wide-Angle Lens
- 4) Mast
- 5) Focus Knob
- 6) Lower Vent

- 7) Locking Knob
- 8) Fan
- 9) Cord Storage Compartment
- 10) Lens Head Compartment
- 11) Power Switch
- 12) Electrical Receptor Port

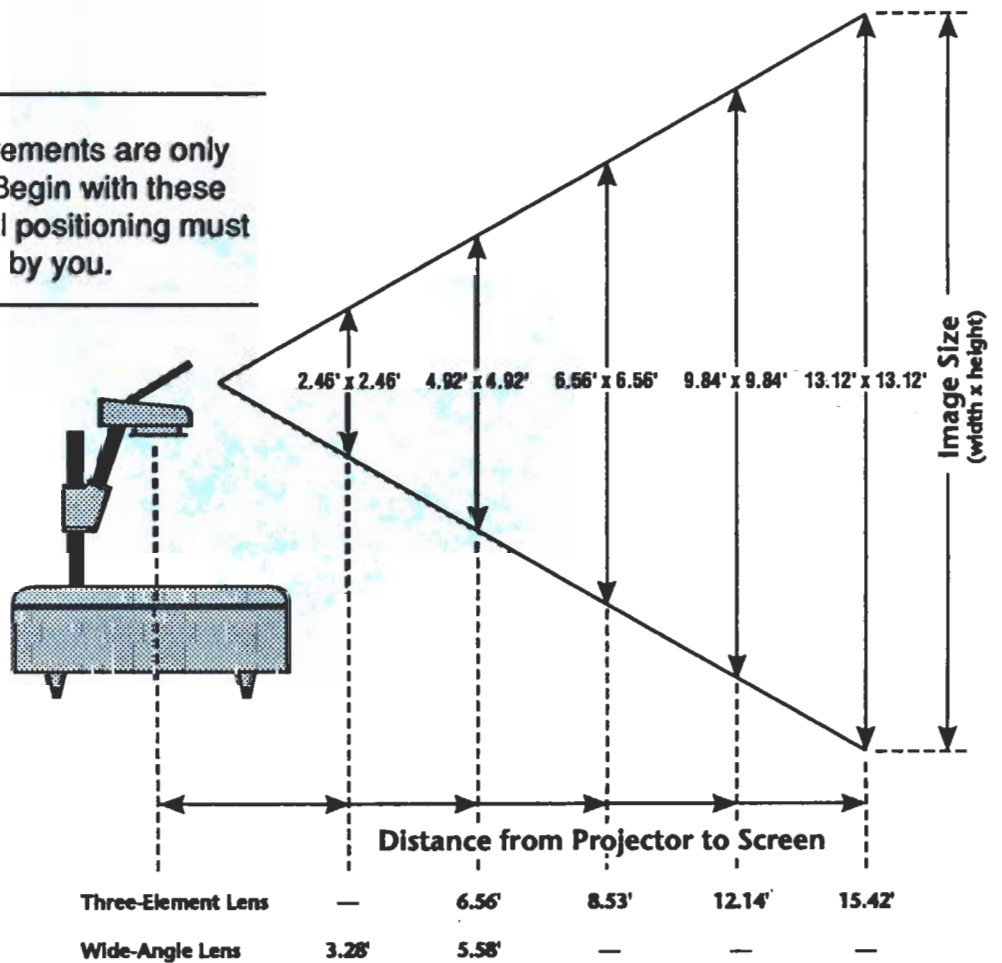
- 13) Handle
- 14) Top Vent
- 15) Lamp Timer (on side not seen in illustration)
- 16) Stage
- 17) Marker Tray

CHART 1: IMAGE SIZE

A <i>Image Width</i>	B <i>Image Height</i>	C <i>Throw Distance*</i> <i>(with wide-angle lens)</i>	E* <i>Throw Distance</i> <i>(with Three-Element Lens only)</i>
2.46'	2.46'	3.28'	—
4.92'	4.92'	5.58'	6.56'
6.56'	6.56'	—	8.53'
9.84'	9.84'	—	12.14'
13.12'	13.12'	—	15.42'

* Distance between a projector and a projection surface

NOTE: These measurements are only approximate. Begin with these numbers. Final positioning must be determined by you.

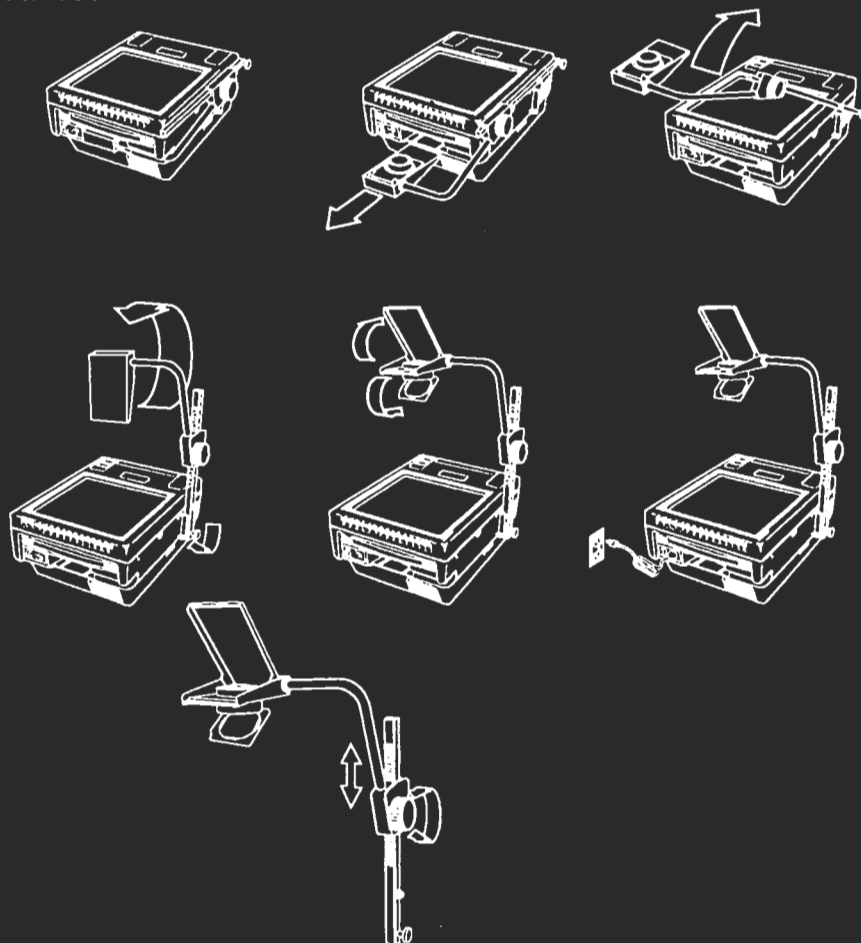


STEPS TO TURNING ON THE MODEL 680 PROJECTOR

Setting up the Model 680 Projector

Refer to the figures below for setting up your Projector and follow these steps:

1. Set the Projector in a horizontal position on a stable surface, such as a desk or table.
2. Turn the focus knob clockwise until the mast is fully extended and the lens head is completely out of its compartment.
3. Rotate the mast clockwise until it is upright
4. Secure the mast by tightening its locking knob
5. Rotate the lens head counterclockwise to its working position. Lift the mirror.
6. For an enlarged view of your image, leave the wide-angle lens in place.
For a standard view of your image, rotate this lens down and away from the lens head.
7. Remove power cord from its compartment and plug unit into the projector and an electrical outlet.



Caution Caution Caution Caution Caution Caution

The ballast ignitor produces lethal electrical pulses with amplitudes of up to 30,000 volts. Maintenance is to be performed by qualified personnel only. Use extreme caution when connecting measuring equipment to operating ballast, ignitor, and lamp circuit. Connection of grounded measuring equipment will cause extensive damage to the supply. Also, the ignitor high voltage could harm digital measuring equipment.

Always disconnect the electrical supply (power cord) before opening the stage cover. Never attempt to defeat the safety interlock system.

Never attempt to operate the unit with the stage cover open, or with any of the safety features inoperative. HMI arc lamps are under high pressure during operation and reach very high temperatures (as much as 950°C). Under certain circumstances internal or external influences may cause the lamp to shatter, sending extremely hot fragments flying with explosive force, which could cause personal injury and/or damage to property.

Check - Out Procedure

ELECTRICAL TEST

Set the line voltage at 115 VAC. Place power switch in "ON" position; the fans and lamp should operate.

Note: The arc lamp will flash when you turn it on, it will then take about three minutes for the lamp to build to full intensity. Fan noise shall not be objectionable.

Interlock switch test - turn power switch "ON". Remove black screw holding stage lid down. Slowly raise stage lid assembly. The safety interlock must break the AC line (unit shuts down) before the lid opening exceeds a 0.25" gap.

With the power switch on "ON", verify the lamp hour meter is operating by looking for the blinking character on the LCD hour meter readout.

OPTICAL TEST

Place the test target on the unit and project a 60" X 60" picture.

Projected stage frame should be parallel to the edge of the screen.

Resolution: Using the test target with the three element lens (wide angle lens in the

non-operative position), focus for a sharp picture over the complete format with one focus setting. Move the wide angle lens into its operating position. Place and center the rectangular LCD and test target on the stage. Focus the unit (this lens has some field curvature, a compromise center to corner focus is acceptable).

Using the test target with the three element lens (wide angle lens in the non-operative position), the resolution should be adequate to present a sharp picture over the complete format with one focus setting.

Image when focused shall be essentially free of spherical or chromatic aberrations. Light shall appear balanced over the entire screen.

Distortion: Less than 0.57% (w/Standard Projection Lens)
Less than 1.0% (w/Wide Angle Lens)

Projected aperture tilt shall not exceed ± 2 as judged by a leveling device on a leveled screen that is perpendicular to a leveled projected test stand. (Note that a 2° reading is acceptable.)

Excessive image vibration shall be defined as the inability to discern the 5 horizontal and vertical bars in the "2.0" targets on a 3E test transparency as viewed from the projector position.

MECHANICAL TEST

Set the focus assembly so the top surface is approximately 1" below the top of the rack. Place a force gauge on the flat surface of the focus assembly behind the mast. Apply a slow downward force until the focus knob starts to move. Read the gauge at that moment. It should read between 6 and 14 lbs. The focus assembly should move smoothly up and down over the entire rack. The assembly should stop at the ends of the rack.

The stage should open easily with no binding or sticking.

The head mirror bracket should remain fixed when placed in any position between the up and down stop position. When folded down, the mirror shall not touch the lens.

The mast must not free fall from the vertical position to the horizontal position when the thumb screw is released. The head should rotate freely but not be too loose. The thumb screw should be easy to move to the start of the thread and turn easily until tight.

The wide angle lens must remain fixed in any position between stops. When in operating position wide angle lens must lie parallel and centered on the projection lens.

The lens assembly can be guided into the storage position.

Caution Caution Caution Caution Caution Caution

28A680 LAMP REPLACEMENT PROCEDURE

The ballast ignitor products lethal electrical pulses with amplitudes of up to 30,000 volts. Maintenance is to be performed by qualified personnel only. Use extreme caution when connecting measuring equipment to operating ballast, ignitor and lamp circuit. Connection of grounded measuring equipment will cause extensive damage to the supply. Also, the ignitor high voltage could harm digital measuring equipment.

Always disconnect the electrical supply (power cord) before opening the stage cover. Never attempt to defeat the safety interlock system.

Never attempt to operate the unit with the stage cover open, or with any of the safety features inoperative. HMI ARC Lamps are under high pressure during operation and reach very high temperatures (as much as 950°C). Under certain circumstances, internal or external influences may cause the lamp to shatter, sending extremely hot fragment flying with explosive force, which could cause personal injury and/or damage to property.

In view of the risk of being blinded by the high luminance of HMI Lamps, the arc should never be viewed directly.

HMI Lamps emit ultraviolet energy; therefore, do not operate with a broken or missing cover glass.

LAMP REPLACEMENT

Handle the lamp with clean, lint free gloves. Grease or fingerprints will damage the lamp when it is in operation. If the lamp is accidentally contaminated, clean with alcohol and cotton before initial operation.

Never apply pressure, torsion, or bending forces to the lamp.

Install the lamp with the nipple of the lamp directed straight up.

1. Make sure that the power is removed from the 28A680 by removing the power cord from the unit.
2. Remove the black screw securing the stage lid latch and open the stage lid carefully. Open the stage lid fully.

3. With the back of the projector facing you, open up the top metal cover of the lamp enclosure
4. Remove the small screw on the top of the rear lens assembly (2), and tilt the reflector bracket (3) to the open position.
5. Using a 7mm wrench, remove and save the nut and washer on the “fixed” end of the lamp.
6. Remove the nut and washer on the “floating” end of the lamp.
7. Remove the defective lamp from the lamp assembly.
8. Wearing a soft cotton glove, install the new lamp into the lamp assembly. Rotate the lamp until the nipple is pointing straight up.
9. Assemble the cable and hardware to the “floating” end of the lamp. Torque nut to $5 + 0.5$ IN-LBS, while holding and supporting the lamp at the metal end cap with a gripping tool.
10. Assemble the cable and hardware to the “fixed” end of the lamp. Torque nut to $5 + 0.5$ IN-LBS, while holding and supporting lamp at the metal end cap with a gripping tool.
11. Check to make sure the “floating” end of the lamp is floating in the hole in the insulator receptacle (4). The lamp mounting must not exert any mechanical stress on the lamp.
12. Close the reflector bracket (3) and fasten with the single screw.
13. Close the lamp enclosure (1) metal lid and latch.
14. Close the stage lid tightly and fasten with the single black screw.

LAMP TIMER RESET

To reset the lamp timer: Contact pin 1 to pin 4 for less than one second. Pins are located on rear of the timer (pin 1 is above pin 4). Do not contact pins for longer than one second or timer may be damaged.

PARTS LIST

MODEL 28A680 MAIN ASSEMBLY

Figure #1

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
1-1	115-6975	Lamp Mounting Bracket
1-2	567-2003	Lamp Mounting Plate
1-3	374-176	Lamp Socket Holder (Fixed End)
1-4	750-01-00016	Washer (2 req'd)
1-5	991-633-0406	Screw (4 req'd)
1-6	750-01-00016	Washer (4 req'd)
1-7	991-633-0405	Screw (4 req'd)
1-8	374-177	Lamp Socket Holder (Floating End)
1-9	927-103-0406	Screw (2 req'd)
1-10	466-015-04	Lockwasher (2 req'd)
1-11	530-01-10604	Nut (2 req'd)
1-12	463-283	Condenser Lens
1-13	192-181	Lens Clip
1-14	991-633-0203	Screw
1-15	456-189	Arc Lamp (575W, Metal Halide)
1-16	530-70-6004	Nut
1-17	466-015-08	Lockwasher
1-18	750-99-00226	Washer
1-19	750-99-00238	Washer
1-20	147-3981	Reflector Mtg Bracket
1-21	463-288	Reflector Lens
1-22	191-181	Clips (2 req'd)
1-23	991-633-0203	Screw (2 req'd)
1-24	650-588	Reflector Bracket Spring
1-25	624-313	Lamp Changer Shaft
1-26	750-99-00078	Retaining Ring (2 req'd)
1-27	110-2976	Lamp Holder Assy
1-28	143-36	Bezel Stage, w/inserts
	394-124	Inserts (6-32, 17 req'd)
	455-1147	Data Label
	455-1148	Model Label
	455-1151	Product Name Label
	698-068-0250	Tape (5 in.)
1-29	115-6927	Catch
	970-106-0605	Screw (2 req'd)
1-30	463-270	Top Aperture Glass
	650-583	Lens Spring (2 req'd)
	992-933-8605	Screw (4 req'd)
1-31	147-3879	Actuator Bracket
	992-933-8605	Screw (2 req'd)

PARTS LIST (cont.)

MODEL 28A680 MAIN ASSEMBLY

Figure #1

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
1-32	115-6616	Hinge
1-33	147-1401	Retainer Lid Bracket
1-34	970-106-0605	Screw (3 req'd)
1-35	628-236	Light Shield
	992-933-8605	Screw (2 req'd)
1-36	463-289	Fresnel Lens
1-37	927-103-0608	Screw (4 req'd)
1-38	750-01-01069	Washer (4 req'd)
1-39	466-014-06	Lockwasher (4 req'd)
1-40	628-266	Top Cover Shield
	970-106-0605	Screw (4 req'd)
	455-1170	Caution Label
1-41	110-3208	Lid Stage Assy
1-42	492-61	Mirror
	698-031-0500	Tape
1-43	115-2379	Mirror Box
	698-071-0750	Teflon Tape
1-44	147-3833	Mirror Bracket (2 req'd)
1-45	991-634-0404	Screw (4 req'd)
1-46	677-47	Mirror Support
	991-634-0404	Screw
1-47	115-6986	Bottom Housing (w/inserts)
	394-124	Inserts (6-32, 15 req'd)
	394-125	Inserts (8-32, 3 req'd)
1-48	375-743	Power Base Housing
	290-70	Feet (4 req'd)
	511-494	Model Nameplate
	455-1163	Lamp Replacement Label
	455-1172	CE94 Label
	455-1158	TUV Label
1-49	567-2071	Timer Mounting Plate
	698-031-0500	Tape
1-50	466-014-04	Lockwasher (2 req'd)
1-51	927-103-0403	Screw (2 req'd)
	289-39	Push In Fastener (2 req'd)
		(Use after Dec. 1994)
1-52	286-48	Fan (80mm)
1-53	361-28	Fan Guard
1-54	992-836-4012	Screw (4 req'd)

PARTS LIST (cont.)

MODEL 28A680 MAIN ASSEMBLY

Figure #1

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
1-55	213-14	Timer
	475-260	Lug (2 req'd)
1-56	115-7101	Storage Box (includes 1-57)
	605-999-0024	Pop River (2 req'd)
	698-084-0250	Tape (2 in.)
	970-106-0405	Screw
1-57	210-53-00010	Connector
	605-590-0507	Rivet (2 req'd)
1-58	294-18	A/C Line Filter
	605-999-0024	Rivet (2 req'd)
	475-233	Lug (5 req'd)
1-59	133-858	Interlock Chassis
	172-268	Bushing (2 req'd)
	927-103-0608	Ground Screw
	530-01-10306	Ground Nut
1-60	680-895	Interlock Switch
	475-234	Lug (4 req'd)
1-61	110-2975	Mini Power Supply
1-62	350-56	Grommet (2 req'd)
1-63	970-106-0405	Screw (4 req'd)
	289-38	Push In Fastener (4 req'd) (After Dec. 1994)
1-64	110-2996	Power Supply
	350-458	Grommets (2 req'd)
	553-132	High Voltage Pad (2 req'd)
1-65	970-106-0405	Screw (2 req'd)
1-66	115-6972	Lamp Housing
	172-229	Bushing (3 req'd)
1-67	286-47	Fan (92mm)
	698-9037	Alum. Foil
	289-35	Fasteners (4 req'd)
	398-083-0500	Foam Tape
1-69	628-273	Arc Shield
	750-01-00099	Rear Washers (2 req'd)
	466-015-06	Lockwasher (2 req'd)
	530-01-10306	Nut (2 req'd)
	320-99-00029	Thermal Cutout Switch

PARTS LIST (cont.)

MODEL 28A680 MAIN ASSEMBLY

Figure #1

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
1-70	492-71	Hot Mirror
	192-182	Clip (3 req'd)
	991-634-0404	Screw
	605-999-0051	Rivet (2 req'd)
1-72	173-118	Plug Button (2 req'd)
1-73	455-62	Caution Label
1-74	628-193	Heat Sheild (2 req'd)
1-75	530-18-00003	Nut (4 req'd)
1-76	750-01-01082	Washer (4 req'd)
	192-163	Clip
1-77	289-34	Push-In Fastner (2 req'd)
1-78	192-183	Clip (2 req'd)
1-79	970-106-0605	Screw (4 req'd)
1-80	970-106-0605	Lamp Housing to Base Screw (2 req'd)
1-81	970-106-0605	Screw (2 req'd)
1-82	187-82	Lower Catch
1-83	991-633-0605	Screw
1-84	115-2959	Switch Plate
	597-450	A/C Receptacle
	680-936	Power Switch
	475-233	Power Switch Lug (4 req'd)
	530-01-10306	Wire Ground Nut
	393-113	Ferrite Sleeve
1-85	147-4062	Mast Stabilizing Bracket
	530-01-10606	Mast Stabilizing Nut (2 req'd)
	466-015-06	Mast Stabilizing Washer (2 req'd)
	992-234-0604	Mast Stabilizing Screw
1-86	481-100	Magnetic Support (3 req'd)
1-87	147-1034	Mast Support Bracket
1-88	979-263	Mast Mtg Screw (3 req'd)
1-92	922-234-0808	Mast Mtg Screw (2 req'd)
1-93	977-101-1424	Bolt
1-94	750-01-00099	Flatwasher
1-95	750-99-00244	Washer
1-97	942-148-0805	Set Screw

PARTS LIST (cont.)

MODEL 28A680 MAIN ASSEMBLY

Figure #1

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
1-98	368-97	Handle
	395-407	Insulator
	970-106-0605	Insulator Screw
1-99	750-01-00072	Washer (2 req'd)
1-100	466-015-10	Lockwasher (2 req'd)
1-101	530-01-10340	Nut (2 req'd)
1-102	115-6987	Air Shield
	698-031-0500	Tape (5 in.)
	698-083-0500	Flange Shield Tape
	192-161	Clamp
1-103	115-6474	Fan Grille
1-104	991-634-0404	Screw (2 req'd)
1-105	970-106-0605	Screw (3 req'd)
1-106	970-106-0605	Screw (3 req'd)
1-107	147-1403	Lid Retainer Bracket
1-108	991-633-0403	Screw
1-109	147-1999	Bracket Stop
	927-103-0610	Mirror Bracket Adj. Screw
	567-1297	Shim Plate
	605-999-0023	Pop Rivet
1-110	698-039-1000	Teflon Tape (2 pcs.- 2 in. each)

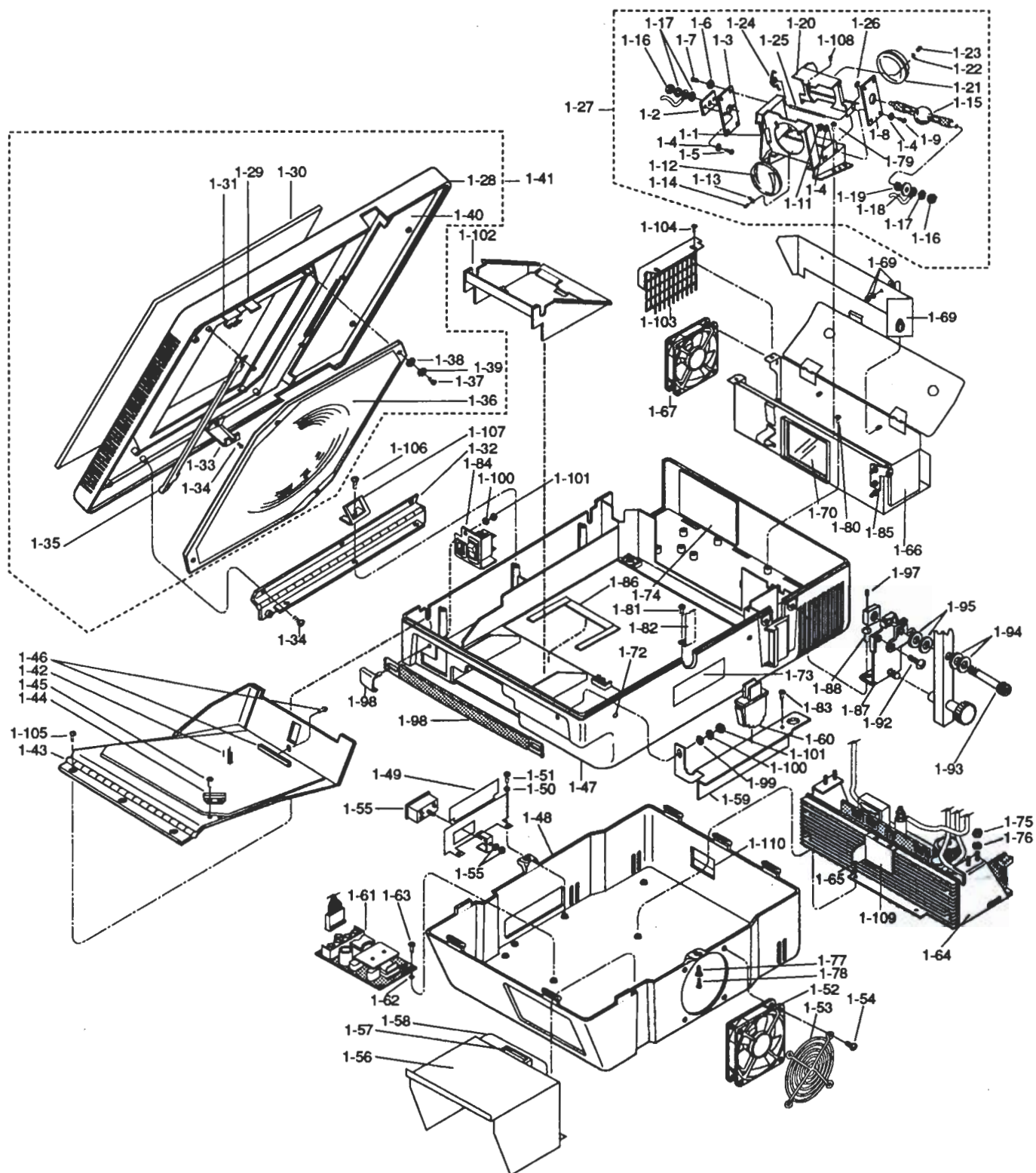


Figure #1

PARTS LIST

MODEL 28A680 HEAD STAGE

Figure #2

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
2-1	433-12	Key Locator
2-2	634-052-0209	Spacer
2-3	624-309	Shaft
2-4	344-110	Gear
2-5	564-58-07814	Pin
2-6	750-99-00069	Washer
2-7	375-680	Housing
2-8	716-59	Mast
2-9	344-111	Gear Rack
2-11	992-234-0604	Screw (2 req'd)
2-12	115-6409	Tension Plate
2-13	979-240	Screw
2-14	650-576	Tension Spring
2-15	173-104	Bearing Button (4 req'd)
2-16	115-6403	Plate Housing
2-17	750-99-00201	Retaining Ring Washer
2-18	108-245	Head Arm
2-19	466-015-08	Lockwasher (2 req'd)
2-20	530-01-10608	Nut (2 req'd)
2-21	698-073-0750	Tape (3 inches)
2-22	172-240	Bushing
2-24	979-261	Screw (5 req'd)
2-25	440-391	Focus Knob (Includes #2-26)
2-26	979-223	Set Screw (2 req'd)
2-27	750-01-00098	Washer
2-28	650-580	Spring
2-29	750-99-00018	"E" Washer
2-30	979-238	Captive Screw
2-31	181-103	Cap
2-33	115-6492	Lens Bracket
2-34	599-84	Lens Retainer (2 req'd)
2-35	463-263	Projection Lens
2-36	991-634-0405	Screw (4 req'd)
2-37	466-037-19	Lockwasher (4 req'd)
2-38	115-6520	Upper Lens Housing
2-39	172-269	Bushing

PARTS LIST (cont.)

MODEL 28A680 HEAD STAGE

Figure #2

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
2-40	979-248	Set Screw
2-41	530-98-00026	Elastic Stop Nut (4 req'd)
2-42	211-1476	Mirror Mounting Cover
2-43	492-60	Mirror
	698-9031	Tape (See Drawing for Taping Inst.)
2-44	530-98-00025	Elastic Stop Nut (2 req'd)
2-45	750-99-00224	Teflon Flasher
2-46	750-99-00229	Washer (4 req'd)
2-47	750-99-00225	Spring Washer (2 req'd)
2-48	979-235	Screw (2 req'd)
2-49	181-104	End Cap
2-50	605-999-0067	Pop Rivet
2-51	194-62	Collar
2-52	677-89	Magnet Support
2-53	979-223	Set Screw (2 req'd)
2-55	110-2610	Lens Magnifier Assy
2-56	750-99-00115	Washer
2-58	110-3207	Lens Head Assy (Includes #2-55)
2-59	750-99-00068	Spacer Washer (If needed to square head)
2-62	677-87	Mirror Support
2-63	605-590-0109	Rivet
2-64	530-97-00106	Nut

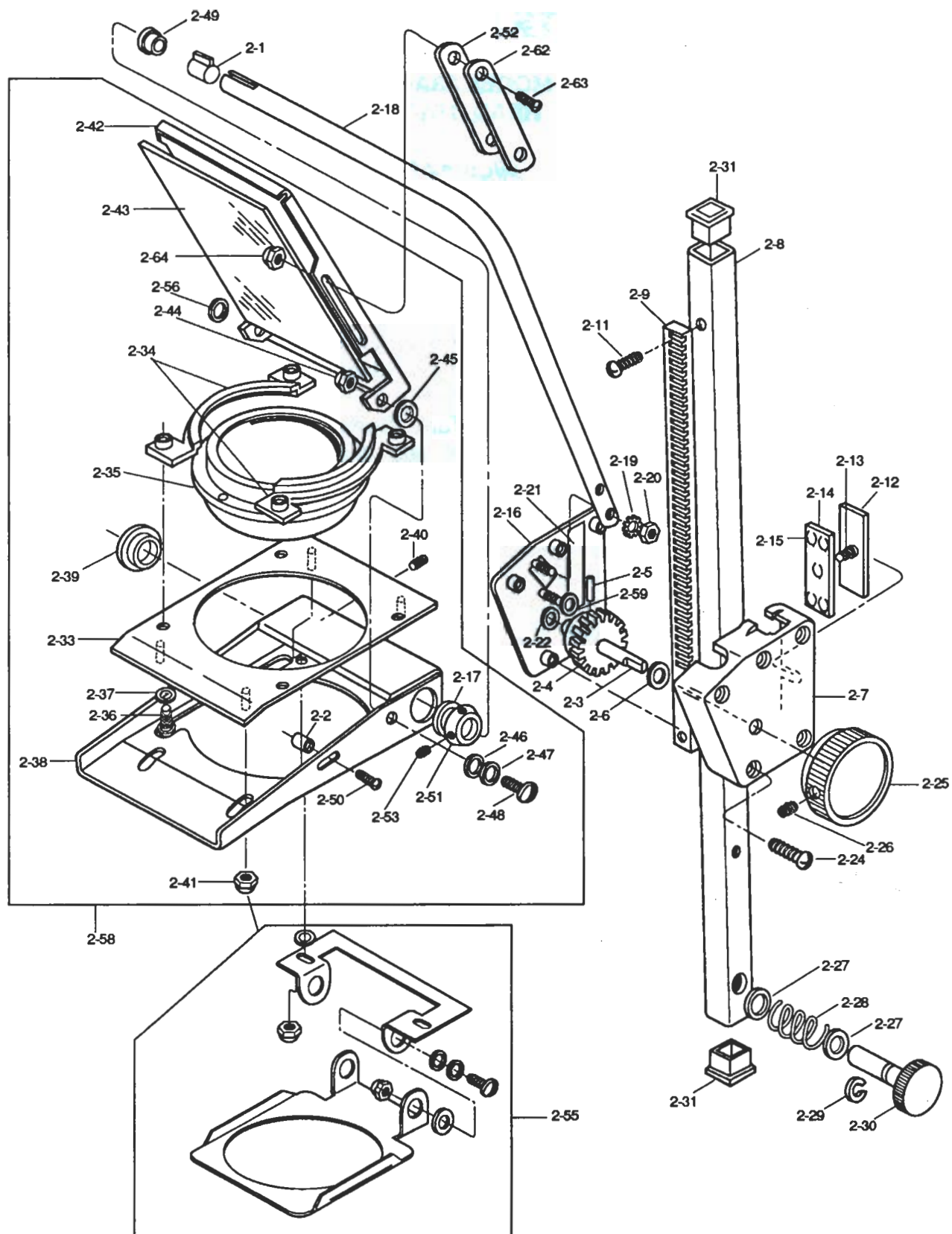


Figure #2

PARTS LIST

MODEL 28A680 ELECTRICAL PARTS NOT ON P.C. BOARD

Figure #3

<u>ITEM #</u>	<u>PART#</u>	<u>DESCRIPTION</u>
	200-1009	120 V LINE CORD
CB-5	200-1084	CABLE
CB-6	200-1083	CABLE
EM-1	393-113	FERRITE SHIELDING SLEEVE
FN-1	286-48	FAN (80MM)
FN-2	286-47	FAN (92MM)
	289-35	FASTENERS (4 REQ'D)
F101	320-99-00029	THERMAL FUSE
	927-103-0404	SCREW (2 REQ'D)
	466-015-04	LOCKWASHER (2 REQ'D)
	530-01-10304	NUT (2 REQ'D)
	475-102	LUG (2 REQ'D)
J101	210-53-00010	STRIP
	475-232	LUG (6 REQ'D)
LF-1	294-18	LINE FILTER
	475-233	LUG (5 REQ'D)
PEM-1	597-450	POWER ENTRY MODULE
	475-233	LUG (3 REQ'D)
PJ-1	597-240-0002	RECEPTACLE (2 CONTACT)
PP-1	597-240-0006	RECEPTACLE (6 CONTACT)
PS-1	110-2975	MINI POWER SUPPLY
PS-2	110-2996	LAMP POWER SUPPLY
S101	680-895	INTERLOCK SWITCH
	475-234	LUG (4 REQ'D)
S103	680-936	POWER SWITCH
	475-233	LUG (4 REQ'D)
TM-1	213-14	TIMER
	475-260	LUG (2 REQ'D)
TS-1	456-189	ARC LAMP

